



Strategic Weapons in the 21st Century: Understanding the New U.S. Policy Context

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Meeting Summary

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Drafted by Karen Miller (LANL), Jacek Durkalec (LLNL),
Ashley Bahney (LLNL), Brad Roberts (LLNL)

The annual Strategic Weapons in the 21st Century (SW21), co-hosted by Los Alamos and Lawrence Livermore National Laboratories (LANL, LLNL), brought together a diverse group of about two hundred experts from the three United States nuclear weapons labs, U.S. federal government and military, think tanks, universities, and foreign partners to share perspectives on important issues in strategic deterrence. All remarks and discussion were on a non-attribution basis.

The objectives of this year's event were:

- To understand the new policies and approaches of the Trump administration
- To understand areas of continuity and change with previous Nuclear Posture Reviews and the challenges of implementation
- To better understand domestic and foreign reactions
- To characterize and assess implications for the U.S. nuclear enterprise.

Key Themes:

- The administration's views of the required adaptations in U.S. nuclear policy and posture follow from an assessment of changes in the security environment since 2009, and also from revised strategies for national security and national defense. Nuclear deterrence is embedded in a larger collection of ideas about restoring American strength and positively influencing the security environment.
- The 2018 NPR reflects a great deal of continuity in U.S. policy and posture since the end of the Cold War and, indeed, even longer. This is especially so of declaratory policy and the commitments to the Triad. For this administration as the last, extended deterrence is a high priority. Changes to policy and posture are driven by changes in the security environment.
- The planned supplemental low-yield capabilities are intended to address a gap in the deterrence posture that has emerged in recent years. The gap is implied by Russia's continued large-scale investments in low-yield nuclear options for the European theater, in the context of improving anti-access, area-denial strategies that erode the credibility of NATO's nuclear deterrent. There is a strong case that the addition of these supplemental capabilities will raise the nuclear threshold in Europe by reducing the confidence of Russian leaders that NATO lacks the means—and will—to retaliate for Russian attacks with low-yield weapons.
- Prior NPRs well illustrate multiple challenges of implementation, including sustaining leadership focus, ensuring needed fiscal resources, and adapting policy and posture in light of newly emerging challenges. To promote effective implementation, this NPR will be followed by an implementation guidance document for DoD and interagency action.

- The 2018 NPR has generated controversy and criticism, which is no different from prior NPRs. It has also generated praise for its generally moderate tone and limited changes. Many allies have expressed public and private support for its conclusions. There is a solid basis for political support sufficient to nuclear modernization.
- The 2018 NPR puts additional demands on an already heavily-burdened nuclear enterprise. It maintains the existing approach to stockpile modernization—through life extension—while moving beyond the so-called 3-plus-2 vision of the future stockpile. The review re-commits national leadership to enhanced responsiveness and to the necessary funding. It also lays out clear commitments to fix bottlenecks in the supply of special materials. There is reason to be cautiously optimistic that the necessary funding will be found to enable success. But success will require more than funding. It will require also changes to the culture of NNSA and to the partnership with DoD.

Panel 1 – The Policy and Posture Reviews of the Trump Administration

This first panel examined the following questions:

- What are the main results of the Nuclear Posture Review?
- What are the main results of the Ballistic Missile Defense Review?
- What are the main elements of the National Defense Strategy, especially as they bear on deterrence?

The National Defense Strategy sets out the primary new security problems confronting the United States: the renewal of major power rivalry and the erosion of the military situation vis-à-vis Russia and China. Thus the emphasis is put on a strategic competition with Russia and China. Deterrence remains a major defense policy objective, along with other objectives such as dissuasion, effective defense against attempted *faits accompli*, and the development of long-term sustainable advantages. The primary emphasis is on the development of a long-term competitive approach. The Missile Defense Review remains in development. It has been retitled to reflect its focus on missiles other than ballistic ones. The December 2017 National Security Strategy set out some high-level policy objectives, including a commitment to stable strategic relations with Russia and China in the context of significantly improving missile defense of the American homeland, of American forces abroad, and of U.S. allies.

The NPRs of 2010 and 2018 overall set out very similar policy objectives but, given changes in the security environment, the priority among them has shifted. The top priority in 2010 was to deal with the risks of nuclear employment by terrorists or proliferators. This remains a priority in 2018, but the top priority is now deterrence of major power nuclear-backed aggression and coercion. This conclusion followed lengthy internal review. There was no desire to return to nuclear testing and no increase in stockpile size. The Office of the Secretary of Defense (OSD) and Joint Staff are leading the implementation phase, and the Nuclear Weapons Council will play a substantial role in monitoring implementation.

Hedging will require flexibility, responsiveness, and a robust infrastructure. The top priority for infrastructure is achieving 80 pits per year by 2030. Because of the emphasis on threats and hedging, the NPR eschewed the 2010 prohibition on new designs or capabilities. While this policy constraint is no longer imposed, moderation was encouraged to maintain consensus.

The case for supplemental capabilities reflects the link between the NDS and NPR. Generally, it is prudent to err on side of more rather than less capability in coercive escalation, as long as

destabilizing threat perceptions on the part of adversaries do not result. The low-yield sea-launched ballistic missile (SLBM) and sea-launched cruise missile (SLCM) are designed to impose costs on limited-use scenarios and raise the nuclear threshold of our adversaries. Clear communication of our intentions and capabilities to Russia and China can reinforce stability.

Panel 2 – Implementation Challenges: Lessons from Prior Reviews

This panel focused on the following main questions:

- What are the main elements of continuity and change in policy and posture that will affect implementation?
- What are the prospects for successful implementation over the long term?
- What lessons can be learned from the experience of prior administrations?

There are several reasons why the 2018 NPR is in the policy mainstream. There is a long list of constants from earlier NPRs, such as the policy of deterrence, inclusion of both counterforce and countervalue targets, raising the nuclear threshold based on options both large and small, the president as the sole authority on use, tailored deterrence, the Triad, standoff and penetrating weapons, focus on nuclear command and control, credibility, declaratory policy on negative security assurances that support the Nuclear Nonproliferation Treaty (NPT), and arms control, if we have a trustworthy partner. Discontinuities include a renewed emphasis on the primacy of deterrence, an elaboration of declaratory policy on extreme circumstances, and two force structure changes.

Implementation is harder than developing the policy. Major implementation risks include program execution (e.g., not much margin in schedule, complex programs), budget stability (continuing resolutions), and political risk of losing bipartisan support for modernization. It requires coordination across many stakeholders (e.g., DoD, DOE, Congress, allies), so it was recommended that departments assign responsibilities to individuals, not committees to ensure a greater possibility of success.

To modernize U.S. nuclear forces, both DoD and DOE must carry out complex development and acquisition programs that closely overlap in time. There is little tolerance for slippage or delay. The 2018 NPR calls on NNSA to complete planned schedules of 4 warhead Life Extension Programs (LEPs) (W76-1 SLBM, B61-12, W88-alt SLBM and the W80-4 cruise missile warheads), and accelerate the W78 ICBM warhead LEP, sustain the B83 bomb past its retirement date, and plan to field a nuclear warheads for low-yield SLBM warhead options and for a modern sea-launched cruise missile (SLCM). In addition, it lays out a program to “ensure the necessary capability, capacity and responsiveness of the nuclear infrastructures and the needed skills of the nuclear enterprise workforce.”

Challenges to implementation are the need for Congressional authorization and appropriation of the budget to advance a low-yield SLBM warhead option; sustaining the critical human skills so that they are not lost; restore the plutonium infrastructure so that the level of the pit production capacity required can be achieved and sustained; keep the B83 bomb in operation until the B61 LEP is achieved; and restore domestic uranium enrichment capacity to ensure that there is a sufficient LEU to support the level of production of tritium needed. Maintaining people, skills, and infrastructure is at great risk. Work is needed on prototype designs from a clean sheet that provide designers the chance to exercise skills against a full spectrum of design attributes. With

respect to U.S. hedging strategy, the importance of infrastructure and constantly exercising it is key.

Public acceptance of the NPR policies is also key. At a time when Russia and North Korea are generating a wider interest in nuclear security, there is an opportunity to raise public awareness. The success or failure of a shift in national security policy depends on the government's ability to make a compelling case, so every opportunity to educate, explain, and debate the issues should be undertaken. There is a bipartisan consensus on modernization and a public backlash should be avoided.

Panel 3 – The Regional Approach and its Implications for Deterrence

This panel focused on the following main questions:

- What's new and what is not new in the administration's approach to regional deterrence?
- Are U.S. and allied approaches keeping pace with developments in the threat?
- What more can and should be done to strengthen and adapt extended deterrence?

The Obama administration put a major focus on regional deterrence architectures and set out an agenda for strengthening them comprehensively, with nuclear and non-nuclear means. In support of this effort, it renewed or created dialogue mechanisms with allies to focus leadership attention on extended deterrence. The Trump administration's National Security Strategy set out an approach with significant regional components and its NPR has dealt directly and specifically with extended deterrence requirements in a changing security environment.

A central focus of this panel was the need for strong partnerships with the North Atlantic Treaty Organization (NATO) and allies in Asia—as essential for maintaining global stability. The 2018 Nuclear Posture Review has elevated and reinforced U.S. extended deterrence in both Europe and in the Asia-Pacific. This is a response to growing challenges from China and Russia to free and open regional orders as well as advancements in North Korea's nuclear and ballistic missile capabilities. United States strategy is to put the onus of escalation back on potential adversaries.

To deter Russia, its leadership must be convinced that it does not have any meaningful advantage in stake, resolve or nuclear capabilities in Europe. For this purpose, Washington must make it clear to Moscow that (a) America's stake in even a limited regional conflict in Europe is global; (b) that U.S. resolve is underpinned by investments in its conventional and nuclear capabilities; and (c) that new 'supplemental' capabilities are intended to prevent Russia from miscalculating that nuclear weapons can back-up its conventional aggression against NATO without a high risk of nuclear retaliation. Some have dismissed the idea of escalate to de-escalate (nuclear escalation in event of conventional conflict), but Russian exercises, statements, and doctrine point to a real threat. While there is some uncertainty, there is more than enough evidence that the United States and NATO need policies to counter it.

Comparison between the U.S. NPR and the French approach to nuclear deterrence shows a growing convergence in thinking of the two countries, even though some differences remain. There is almost perfect commonality in assessment of strategic environment. Like the United States, France recognizes that big power competition has returned and is planning for the

modernization of its nuclear force in the next 10-15 years. In a similar vein, Paris is concerned about the role that nuclear weapons play in Russian strategic thought, in particular the potential use of nuclear weapons for strategic intimidation. In the French assessment, Russia deliberately exploits ambiguity associated with its nuclear doctrine, exercises, or dual-capable systems. The nuclear shadow over Russia's actions is aimed at paralyzing decision-making process in the West, create divisions among allies, and shape strategic environment in Russia's favor. Russia's progressive unravelling of political and legal norms of military transparency and restraint further undermines the European security architecture established at the end of the Cold War.

France also shares U.S. concerns about nuclear-related developments in Asia, including the threat posed by the DPRK. A single point of disagreement between France and the United States is the future of the Joint Comprehensive Plan of Action (JCPOA). While the agreement is contested in the United States, France has been calling the United States to respect it.

French strategic thinkers perceive U.S. declaratory policy in the 2018 NPR as closer to the traditional French view, namely that nuclear weapons play a role in deterring attacks against vital interests, whenever they come from, and whatever is their nature. The U.S. emphasis on the importance of extended deterrence is welcomed by France, given the role of U.S. extended deterrence in maintaining strategic stability in Europe and in Asia, and contribution of U.S. extended deterrence to non-proliferation.

In the Asia-Pacific security environment, there are five global trends which are visible: (1) the spread of nuclear weapons, including acquisition of new nuclear capabilities; (2) the modernization of nuclear arsenals; (3) the spread of non-nuclear precision strike; (4) the development of integrated air defense systems; and (5) the development of new technologies, including hypersonic delivery systems. It appears that all five trends apply to China and Russia, whereas only the first applies to North Korea, which has been diversifying its arsenal. It was argued that the United States and allied force posture against DPRK should be different than against China or Russia.

There is no one-size-fits-all in terms of doctrine or operational concepts. Also, deterrence and assurance are separate but connected. What deters an adversary isn't necessarily the same thing that assures an ally. To increase confidence in deterring the DPRK, the United States should explore an active deterrence posture that includes: nuclear strike capabilities; ISR capabilities that would allow the U.S. to determine what DPRK is doing in real time; boost phase missile defenses; and U.S. ability to hold different targets at risks and to destroy them promptly. Diplomacy is seen as the only viable path to denuclearization of DPRK but it has been difficult because of different Russian and Chinese priorities in the region. Synchronization of policies between U.S., Japan, and South Korea has been also a challenge.

While U.S. allies in the region are comfortable talking about the threat posed by North Korea, they are less comfortable talking about China. Economic leverage is effectively used by China to expand its regional and global influence. It leads to perceptions in the Asia-Pacific that global and regional balance between the United States and China is determined more by economic factors than by nuclear weapons. United States withdrawal from Trans-Pacific Partnership in this context is seen as counter-productive by some U.S. allies in the region.

Some allied thinkers do not perceive U.S. extended deterrence as having a direct role in addressing China's "gray zone" strategy of regional expansion. Yet, the U.S. posture may have made China more cautious. While, there is recognition that U.S. extended deterrence should not be linked to any specific weapon system, "supplemental capabilities" proposed by the NPR – low-yield warhead for submarine launched ballistic missile and sea-launched cruise missile – are seen as making extended deterrence in Asia more credible. Despite the role of dual-capable aircraft in extended deterrence in the Asia-Pacific, host-support for these capabilities has not been assured yet. The role of nuclear weapons in deterring non-nuclear strategic attack is supported by Tokyo. In the past, Japan was skeptical about making deterrence of nuclear attacks the sole purpose of U.S. nuclear weapons.

Japan has been increasing its contribution to regional deterrence architecture by changes in interpretation of its constitution, and defense investments. Tokyo believes it shares Washington's assessment of the threat environment and argues that it plays an important auxiliary role in deterring regional aggression. United States and Japanese experts opined that more needs to be done to make U.S. and allied forces in the region more operationally integrated. The most difficult part of strengthening deterrence in the Asia-Pacific region is to create a viable deterrence strategy.

There is a need for more education about deterrence and assurance in government and academia. The past models don't necessarily apply in whole, and we need to effectively communicate these issues with the broader public.

Panel 4 – Implications for the U.S. Nuclear Enterprise

This final panel focused on the following main questions:

- With this third presidential-level commitment to modernize the complex, what can we reasonably expect?
- What challenges lie ahead in successfully fulfilling the President's guidance?
- What can the laboratories contribute to success?
- What is the role of the laboratories in support of the National Security Innovation Base referenced in the National Security Strategy?

The final panel sought to encourage NNSA and the nuclear weapon enterprise to use the momentum of the 2018 NPR to undertake long-term analysis, implement needed changes, and to be creative in its solutions. The panel members reminded the participants that there were challenges on the horizon and nuclear weapons are going to continue to be relevant, so it is important that the nuclear weapon enterprise be prepared.

It was noted that the 2018 NPR suggested only modest changes to the nuclear weapon stockpile program of record. The general belief is that life extension programs are proceeding well and will continue to receive broad support. However, the panel expressed concern over future funding of the Interoperable Warhead One (IW1), as well as the anticipated benefits of the system; suggesting the enterprise engage the Navy and the Air Force to gain a better sense of the long-term stockpile needs.

Additionally, stockpile certification was raised, highlighting the long-term challenges associated with aging material. The panel did not offer any solutions, but encouraged the participants to

take on the task of addressing the growing concerns sooner rather than later. A great deal of thought and planning for the unexpected will be needed to meet the certification challenges to come.

Concern was also expressed regarding NNSA's ability to fabricate 80 nuclear weapon pits per year, as well as the ability to modernize its own infrastructure. Stockpile responsiveness is going to remain a challenge even with the support of the 2018 NPR, and it was noted that it would be in the enterprise's best interest to come up with alternatives and options, as well as to prioritize key components of each project to achieve the broader goal. Specifically, it was suggested that consideration of requirements be based on the analysis of threats and the metrics set to measure success.

The existing uncertainty within the arms control community was raised, recognizing that the near-term bilateral arms control agreements are collapsing and, therefore, leaving the future health of arms control regimes uncertain. The value that the enterprise can add to solving impending arms control challenges was raised. The panel also reminded the audience that the NPR highlights the importance of the nuclear enterprise in global security and reminded the attendees of the important role the enterprise plays in nonproliferation, counterproliferation, treaty compliance and in the intelligence community. Leadership and long-term planning on the part of NNSA – to include investing in science, technology, engineering and mathematics- is needed to maintain capabilities in these and other security areas.

As a whole, the continuing relevance of nuclear weapons into the future was noted. This reinforces the need for the nuclear weapon enterprise to be planning for the long-term. The panel hoped that NNSA would move out of process-oriented thinking to an outcome-oriented approach, and to integrate new technology including additive manufacturing into their tactics.